

## **An Investigation of Education for Sustainable Development Competencies: A Case Study of GFP Teachers of University of Buraimi**

Asma Hamyar Al Azzani

Centre of Foundation Studies, University of Buraimi (UoB), Sultanate of Oman

Education for Sustainable Development (ESD) is a kind of education that has recently gained international prominence for solving many sustainability challenges. The current quantitative research seeks to investigate the University of Buraimi General Foundation Program (GFP) teachers' education for sustainable development competencies and their aspects. It aims to answer two questions: What education for sustainable development competencies do the GFP teachers at the University of Buraimi have? And what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess? This research is significant, as it will help all stakeholders evaluate the current teaching competencies of education for sustainable development that in-service teachers have and how to develop them to achieve the main plan of education for sustainable development by 2030. A total of twenty GFP teachers participated in the current study for the academic year 2022–2023 at the University of Buraimi. They were selected using a convenience sampling procedure. One electronic questionnaire was used to collect data. The Statistical Package for Social Science (SPSS) software (version 23) was used to analyze the data. Results show that GFP teachers' ESD competencies are higher than their transversal competencies and science education competencies, respectively. They further show that GFP teachers are more competent in raising students' environmental awareness, putting an emphasis on intellectual development, and thinking about the effects of their behaviors on their countries and the world than the rest of the current research competencies' aspects. The current research implications and future research avenues were also discussed.

**Keywords:** Education for Sustainable Development (ESD), Sustainable Development (SD.), competencies, sustainability

### **1. Introduction**

Education for Sustainable Development (ESD) is a kind of education that has recently gained international prominence in solving many sustainability challenges. It is the kind of education that responds to the world's needs, perceptions and conditions. It is the kind of education that emphasizes how local needs affect internationally. This education helps learners to acquire knowledge, skills, attitudes and values for a sustainable future (Agbedahin, 2019; Leal Filho, 2015). It helps them to take decisions and actions in the main local or global problems of the environmental, economic, and social dimensions to achieve environmental integrity, economic validity and cultural diversity respect. Significantly, this kind of education develops learners' experiences of lifelong learning (Agbedahin, 2019). Education is not only the domain that achieves a sustainable future. However, without teaching and learning for sustainable development, the goal of sustainability will not be achieved. Education for Sustainable Development (ESD) is the primary type of education that could develop sustainable practices for a sustainable society (Cifuentes-Faura, Faura-Martínez & Lafuente-Lechuga, 2020; Rafika, Rym, Souad & Youcef, 2016).

Sustainable Development (SD.) was founded in the 1980s by the World Commission on Environment and Development (WCED). It (1987, as cited in Agbedahin, 2019, p. 2) defined sustainable development as "a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs". To bring sustainable development to the educational setting, teachers must have some sustainability competencies (Cifuentes-Faura, Faura-Martínez & Lafuente-Lechuga, 2020; Rafika, Rym, Souad & Youcef, 2016). Education for sustainable development requires participatory teaching and learning methods which could be implemented in formal and informal education systems to help learners to take the responsibility to learn, reflect, change behaviors, and take action for sustainable development. Formal systems of education are systems which are based on defined curricula, and they are primarily in public and private schools. However, informal education systems are systems which are not based on structured resources like magazines, newspapers or journals (Agbedahin, 2019). Henderson, Michel, Bryan, Canosa, Gamalski, Jones and Moghtader (2022) demarcated sustainability competencies as the knowledge, attitudes and behaviours of doing something. Rafika, Rym, Souad and Youcef (2016) focused that the current professionals or the future ones should have the knowledge and skills for professional practices to achieve a profound transformation of education. Consequently, sustainability awareness and knowledge could be strengthened among learners. Cebrián, Junyent and Mulà (2020) defined teaching competencies of education for sustainable development as "the competencies that teachers and educators need to put in place in the educational settings in order to promote sustainability competencies amongst their students" (p. 2).

With the calls of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the main agency for implementing and monitoring ESD around the world, for education for sustainable development application during the current decade, the main question that needs to be answered is whether teachers who are under the umbrella of higher education in Oman have the competencies for implementing ESD especially if the Omani higher education originally encounters many challenges to offer graduates who have the necessary competencies that the market needs. Ali, Al-Saadi and Scatolini (2022) stated that research studies showed that the universities and colleges in Oman failed to graduate students who are qualified for occupational requirements. Abasaid and Ferreira (2022) and Ali, Al-Saadi and Scatolini (2022) stated that although there are many attempts to reform higher education in terms of quality and quantity either in Oman or the Arab Gulf region to graduate learners with knowledge and skills needed in private and public sectors, graduate learners show poor academic and professional performances. According to them (2022), students lack knowledge and soft skills, such as critical thinking skills and problem-solving strategies. Rieckmann and Barth (2022) and Cebrián, Junyent and Mulà (2020) emphasized that there is a positive interface between learner's development competencies and educators' competencies. Consequently, it is necessary to investigate teachers' competencies, especially in education for sustainable development, as a step to successfully apply Education for Sustainable Development (ESD) in the educational field. In the research realm, most of the studies done in the Omani context were mostly for designing models of applying ESD, investigating teachers' or administrators' perceptions and attitudes toward applying ESD in

general or for specific subjects, or investigating some goals of education for sustainable development. However, a dearth of studies has investigated teachers' competencies of education for sustainable development. Nikolaou (2021) emphasized that there is a need for research studies that investigate sustainable development in higher education in Oman, showing what has been realized, the main needs, and the main feedback. Similarly, in the research realm of other contexts, Henderson et al. (2022) stated that there is a need for research studies that foster the sustainability of learning in higher education. Daniali, Barykin, Khortabi, Kalinina, Tcukanova, Torosyan, Poliakova, Prosekov, Moiseev and Senjyu (2022) also asserted that there is a need for research studies on employees' competencies in various contexts. In a similar vein, Cebrián, Junyent and Mulà (2020) recommended assessing teachers' competencies development.

Therefore, the motivation of the current research is to investigate Omani higher education teachers' competencies for education for sustainable development. It aims to investigate the University of Buraimi General Foundation Program (GFP) teachers' education for sustainable development competencies and their aspects. This research is significant as it will help all stakeholders to evaluate the current competencies that in-service teachers have and how to develop them. It will help them to know how to design the programs for the professional development of in-service or pre-service teachers. This research could further help the directors of education for sustainable development for 2030 to evaluate the current needs of teachers. Therefore, the learning process could be developed even partially. The current research will answer two questions: What education for sustainable development competencies do the GFP teachers at the University of Buraimi have? And what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess? The competencies that the current research investigates are the ESD, transversal and science education competencies. The ESD competencies involve the ability of a teacher to raise students' awareness of the environment, foster their sense of belonging to it, analyze its issues, act and make decisions to solve these issues. In contrast, transversal competencies are the competencies which are about the ability of a teacher to promote students' reflection, responsibility, intellectual development, and attitudes toward social cooperation to solve environmental issues. However, science education competencies are the competencies which emphasize the ability of a teacher to observe and analyze the phenomenon scientifically, providing pieces of evidence, contrasting ideas and suggesting improvement actions. They further involve the ability of a teacher to provide appropriate explanations or predictions of environmental issues. The researcher expects that GFP teachers at the University of Buraimi do not have the competencies needed for education for sustainable development. This research is constructed to start with the literature review of education for sustainable development, and it will be ended with the research methodology, the results that were found, the discussion of the results and the conclusion of the study as a whole respectively.

## **2. Literature review**

### **2. 1. Definitions**

With the calls of UNESCO to apply education for sustainable development during the current decade and the challenges that Omani higher education originally encounters to graduate learners who are qualified enough for the market, the question that needs to be answered is whether teachers in the Omani higher education have the competencies for education for sustainable development. In literature, many researchers designed models of applying the ESD, investigated teachers' or administrators' perceptions and attitudes toward applying ESD in general or for specific subjects, or investigated some goals of education for sustainable development. However, there is a need for more studies that investigate teachers' competencies in applying education for sustainable development in the educational field. Nikolaou (2021), Henderson et al. (2022), Daniali, Barykin, Khortabi, Kalinina, Tcukanova, Torosyan, Poliakova, Prosekov, Moiseev and Senjyu (2022) and Cebrián, Junyent and Mulà (2020) asserted that there is a need of research studies that emphasize teachers' competencies of education for sustainable development or their needs in higher education.

Education for Sustainable Development (ESD) was defined as "an educational process characterized by approaches and methods aimed at fostering awareness about the issues pertaining to sustainable development (e.g., social, political, economic and ecological matters" (Leal Filho, 2015, p. 4). In addition, it was defined as "a capacity to think critically about what experts say and to test ideas, exploring the dilemmas and contradictions inherent in sustainable living" (Scharenberg, Waltner, Mischo & Rieß, 2021, p. 2).

On the other hand, competence was defined as a group of knowledge, skills, attitudes, motivation, and value systems to assist individuals in solving dilemmas in various contexts and performing tasks successfully (Rieckmann & Barth, 2022). Sustainability competencies are "a set of knowledge, skills, and values that are fundamental to ensure students' capability to adapt to the complexity and uncertainty of sustainability issues" (Imara & Altinay, 2021, p. 2). The difference between sustainability competencies and ESD competencies is that the former is "the combination of cognitive skills, practical abilities, and ethical values and attitudes mobilized in a real situation or context related" but the latter is "the competencies that teachers and educators need to put in place in educational settings in order to promote sustainability competencies amongst their students" (Cebrián, Junyent and Mulà, 2020, p. 2). Rieckmann and Barth (2022) stated that ESD competencies are "a capacity to support the development of sustainability competencies through a range of innovative teaching and learning practices (p. 5). The current research follows the definition of Scharenberg, Waltner, Mischo and Rieß's definition of education for sustainable development and Cebrián, Junyent and Mulà's definition of ESD competencies.

### **2.2. Education for sustainable development competencies: theoretical underpinnings**

Education for sustainable development competency was originally traced back to the Competency-based Approach or Competency-based Education. This approach was founded in the 1920s and used practically in the 1970s. The form of this approach is regularly

updated. The vital notion of this approach is that with the openness of societies, increased informatization, and a dynamic environment, education should enable learners to solve dilemmas in unfamiliar contexts or situations. This approach aims to create a balance between general and professional education and the needs of society and the job market (Butova, 2015). It aims to make sense of the learning process by relating it to students' real lives. It aims to create authentic learning opportunities for students as a source of acquisition. It aims to present the prime core competencies that students must have after a learning process (Haddouchane, Bakkali, Ajana & Gassemi, 2017) and the way of implementing them at all levels of education (M. Makulova, Alimzhanova, Bekturganova, Umirzakova, L. Makulova, Karymbayeva, 2015).

According to the competency-based approach, both teachers and students have a role. The role of teachers is to organize the learning outcomes in the best way to bring students to the level expected. Teachers in the competency-based approach should provide learners with means that help them to learn. In addition, they have to facilitate knowledge rather than transmit it. They should encourage students to acquire knowledge. They should also encourage them to be creative. They have to ensure that the planning and organization of activities that students prepare are good and aligned with the objectives. They have to suggest ideas for them without any imposing. On the other hand, the role of students in the process of learning based on the competency-based approach is to suggest ideas. They must have the desire to know, learn, and organize the work by using new technologies and methods and looking for new information. They must mobilize the available resources to achieve a task (Haddouchane, Bakkali, Ajana & Gassemi, 2017).

The evaluation of learning in this theory is based on whether learners master competencies and prerequisite materials for achieving them. The mastery competencies were defined as the learners' ability to apply knowledge in real-life situations. In this theory, learners must have knowledge, skills, attitudes, values and behaviors to pass (Henri, Johnson, Nepal, 2017; Gervais, 2016). The purpose of this approach is not to rank learners but to help them learn how to accomplish a goal. It helps learners to escalate the probability of their success by providing them with instructional routes. The time and objectives are underscored in the competency-based approach. This approach highlights that learners' mastering of competencies could differ between students, but the objectives are the same (Butova, 2015). This approach could seem for learners, but it is also for teachers. As students' facilitators, teachers have to have specific competencies that help students to have the required skills that are necessary in this competitive world which was originally controlled by globalization (Takkaç Tulgar, 2020).

### **2.3. Past studies: a review**

#### **2.3.1. Overseas research studies**

Ammoneit, Turek and Peter (2022) performed a quantitative research study to assess 100 pre-service geography teachers' competencies and attitudes towards the German ESD orientation framework to determine the needs of teachers in higher education. The main research instrument that was used to collect data was a survey. Results showed that the

competence assessment was high. Teachers had high ESD-related professional competencies. Teachers were confident in content knowledge, and personal and social competencies. However, they needed to be more confident in their pedagogical knowledge. The results further showed that the semester number and school practice module played a vital role in developing these competencies.

In contrast, Moganadas, Subramaniam, Huey, and Bahaman (2020) conducted a quantitative research study on 169 educators at a university to measure their awareness of sustainable development economic, social and environmental dimensions. The research data was collected using online and offline surveys. Results showed significant differences in the level of awareness of sustainable development dimensions among educators. The educators had a high awareness of the social dimension, followed by the economic and environmental one. The needs and gaps of campus sustainability were also discussed.

Maidou, Plakitsi and M. Polatoglou (2019) accomplished a quantitative research study to report the knowledge, perception and attitudes of pre-service early childhood teachers at a university. Results showed that teachers had knowledge of the environmental aspects of ESD. However, they did not have knowledge of societal and financial matters. They thought that ESD was an important issue, but it should be included in the curricula. Consequently, their abilities to teach ESD will be developed in the future.

On the other hand, Cebrián and Junyent (2015) performed a quantitative research study on 32 student teachers to explore their perceptions of education for sustainable development competencies that have priority in ESD school projects. A questionnaire was used to collect data. Results showed that the acquisition of knowledge and the practical skills of nature and natural sciences were more important than the promotion of ethical values and positive attitudes toward sustainable development and the management of emotions. The study recommended that the existing frameworks should be more alive and integrated into the current teacher education curriculum to promote student teachers' awareness and their ESD competencies.

### **2.3.2. In the Omani context**

Nikolaou (2021) performed a qualitative research study to identify evidence of innovation elements through implementing the ecosystem of sustainable development in a higher education environment. Semi-structured interviews and document analysis were the main research instruments. Results showed significant differences in the level of awareness between logistics faculty members. Results further showed that the minimal incentives and grants, the lack of tenure, the low level of cooperation in providing placements and internships, the slow internalization and the limited collaborations were some real reasons for not having the innovation elements in a sustainable development ecosystem in higher education. The study implications showed that there was a low level of awareness among faculty of pedagogical approaches to innovation. They further showed that government



spending was very low in this domain and the industry was not ready for university business collaboration. Therefore, there were limited opportunities for putting theories into practice.

Al-Maamari (2021) accomplished a qualitative research study to analyze the perceptions of educators about citizenship and their practices of it. An interview was the main research instrument. Results showed that educators associated citizenship with patriotism. They associated it with their own personal vision of it. In addition, results showed that teachers had limited practices associated with citizenship education. They needed professional growth in citizenship development.

As it is evident in the literature, to the best of the researcher's knowledge, there are few research studies that are related to educators' competencies of sustainable development. Research studies in this research area are rare. It was clear that most research studies were on a small number of pre-service teachers of some subjects. The available literature partially discusses teachers' perceptions and awareness of sustainable development or some aspects of ESD competencies, knowledge, skills and values. However, it does not clearly present teachers' competencies and their aspects. Therefore, the current research will fill this lacuna, and it will investigate the educators' competencies in sustainable development, drawing a clear picture from the Omani context. It will investigate the University of Buraimi General Foundation Program (GFP) teachers' competencies of education for sustainable development and their aspects.

### **3. Research methodology**

#### **3.1. Research design and context**

The current quantitative research aims to collect numeric data on the University of Buraimi GFP teachers' competencies of Education for Sustainable Development (ESD) and their aspects. The data are primary. They were collected by the researcher in the academic year 2022/ 2023 by using an electronic questionnaire.

The research was done on the General Foundation Program (GFP) teachers at the University of Buraimi, Sultanate of Oman. This program is designed to assist high school graduates in developing their English, computing, math and study skills before starting their specializations. Teachers in GFP have to prepare learners for the previous skills through three levels. The method of teaching at the University of Buraimi is the student-centred method. Teachers at GFP teach learners defined curricula, courses which were not prepared by themselves. The English courses' topics are friendship, art, special possessions, creativity in business, phobia, adventure, family, sport, finding the ideal job, creative thinking, making money, subway etiquette, the fat tax, the heart of a hero, what is your medicine? endangered cultures, sports and obsession, the consequences of fraud, exploring the red planet, language and power, careers of the future, ecotourism, museum and us, and is our climate changing? Math courses, nevertheless, focus generally on developing learners' understanding and skills of statistical concepts, and fractional and algebraic expressions. They further emphasize developing learners' skills in solving logarithmic, and exponential quadratic functions. Math

courses at GFP also emphasize developing learners' understanding of the mathematical approaches and how to use them to analyze the main problems they face daily. The IT courses, on the other hand, emphasize the basic knowledge of information and computing skills. They focus on teaching learners the basic features of PowerPoint, Microsoft Word, and Excel. They focus on the fundamental computer network and computing and the fundamental computer network and file management. They develop learners' skills in using databases, the Internet and email. The study skills courses, in contrast, focus on developing learners' skills in time management, research, library, and presentation.

The study participants were twenty teachers. They have different degrees and years of experience. Table 1 shows these two characteristics in detail.

**Table 1**  
*Study Participants' Characteristics*

| Characteristics                                                                                        | Participants<br>(T= 20) |              |
|--------------------------------------------------------------------------------------------------------|-------------------------|--------------|
|                                                                                                        | Number<br>(N)           | Percentage % |
| <b>Degree</b>                                                                                          |                         |              |
| Master's degree in Teaching English to Speakers of Other Languages (TESOL)                             | 8                       | 34.8%        |
| Bachelor's degrees in English and Cambridge Certificate in English Language Teaching to Adults (CELTA) | 3                       | 13%          |
| Master's degrees in mathematics                                                                        | 2                       | 2%           |
| Master's degree in IT                                                                                  | 3                       | 13%          |
| Degree in English for Specific Purposes (ESP)                                                          | 1                       | 3.4%         |
| A bachelor's degree in education                                                                       | 1                       | 3.4%         |
| Other degrees of science                                                                               | 2                       | 8.7%         |
| <b>Years of experience</b>                                                                             |                         |              |
| (1-5) years of experience                                                                              | 4                       | 17.4%        |
| (6-10) years of experience                                                                             | 1                       | 4.3%         |
| (11-15) years of experience                                                                            | 10                      | 43.5%        |
| (16-20) years of experience                                                                            | 5                       | 21%          |

### 3.2. Participants and sampling

The General Foundation Program (GFP) at the University of Buraimi involves twenty-eight teachers. Table 2 shows the characteristics of the study's population and sample.

**Table 2**  
*The Characteristics of the Study's Population and Sample*

| Characteristics                   | Participants<br>(T= 20) |              |
|-----------------------------------|-------------------------|--------------|
|                                   | Number<br>(N)           | Percentage % |
| <b>Population Characteristics</b> |                         |              |
| Total                             | 28                      | 100%         |
| Males                             | 14                      | 50%          |



|                           |    |       |
|---------------------------|----|-------|
| Females                   | 14 | 50%   |
| Sample Characteristics    |    |       |
| Total                     | 23 | 82%   |
| Males                     | 9  | 39.1  |
| Females                   | 14 | 60.9% |
| Level one                 | 7  | 30.4% |
| Level two                 | 4  | 17.4% |
| Level three               | 1  | 4.3%  |
| Levels one and three      | 1  | 4.3%  |
| Levels two and three      | 2  | 8.7%  |
| The three levels together | 7  | 30.4% |

The study participants were selected by using the convenience sampling procedure. This procedure was utilized because the current research had fewer rules to follow. Participants had merely to be teachers in GFP. The researcher utilized it because there was a need to find a readily available sample to perform the research. Selecting the participants was started after sending WhatsApp text invitations to the targeted sample of GFP. Those who showed that they wanted to participate in the study were sent the questionnaire link. The WhatsApp text was written and sent by the researcher. This way was utilized to ensure that the responses which would be received later would be from the target population (for more information, see the data collection section).

### **3.3. Research instrument**

To collect data for the current study, one electronic questionnaire was employed. The electronic questionnaire was divided into four sections. The first section aims to collect demographic information of the participants, specifically their gender, level of education, years of experience, and the number level teachers teaching in GFP. The second, third and fourth sections aim to collect data on the participants' ESD, transversal and science education competencies, respectively. The current research 17-item instrument was designed with the help of Cebrián, and Junyent's (2015) prioritized list of ESD competencies based on student teacher's views and Chuliá-Jordán, Peña and Llinares's (2022) sustainability competencies map for university degrees in education. The current research questionnaire consists of a 5-point likers scale (1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree). It includes three subscales: ESD competencies, transversal competencies and science education competencies, respectively. The first subscale, ESD competencies, aims to measure teachers' competency of raising students' environmental awareness, fostering their sense of belonging to the environment, helping them to think about different scenarios to a situation or problem on a global and local scale, promoting their critical analysis of some phenomenon or subject where they could position themselves to argue for and respect different points of view, promoting their ability to act and make decisions, promoting their skills to collaborate in socio-educational actions as part of a cooperative community, including the participation of different stakeholders of sustainability, and promoting students' educational values oriented towards responsible and active citizenship. However, the second subscale, transversal competencies, aims to measure teachers' competencies in developing learners' habits and attitudes of transformation at the personal and community levels. In addition, it aims to measure teachers' competencies in developing learners'

intellectual and practical skills to apply the transformation. The intellectual and practical skills are the skills of reflective practice where a learner analyzes a situation or a problem from different perspectives and areas, sets theories to solve the situation or problem, takes action to test them, and respects and values the diversity of biological, social and cultural issues. This subscale also measures teachers' competency in controlling their students' projects to be sustainable and helping them to have the commitment to apply them. On the other hand, the third subscale, science education competencies, aims to measure teachers' competencies to explain and interpret a phenomenon scientifically and identify appropriate explanations and predictions for it. It aims to measure teachers' competency to observe facts of a phenomenon and identify evidence and contrasting data of it. It further aims to measure teachers' competency to analyze the impact of human activities on the local and the global environment and suggest improvement actions. Items 1, 2, 3, 4 and 5 of the ESD Competencies Subscale were inspired by Cebrián and Junyent's prioritized list of ESD competencies based on student teachers' views. However, items 6 and 7 were inspired by Chuliá-Jordán, Peña and Llinares's sustainability competencies map for university degrees in education. On the other hand, items 1, 2, 3, and 4 of the Transversal Competencies Subscale were inspired by Cebrián and Junyent's prioritized list of ESD competencies based on student teachers' views. In contrast, item 5 was inspired by Chuliá-Jordán, Peña and Llinares's sustainability competencies map for university degrees in education. Nevertheless, items 1, 2, and 3 of the Science Education Competencies Subscale were inspired by Cebrián and Junyent's prioritized list of ESD competencies based on student teachers' views.

To measure the validity and reliability of the instrument, SPSS (Statistical Package for Social Science) software (version 23) was used. The Pearson correlation coefficient was used to ensure the research instrument's validity. Results showed that the instrument items correlation is highly significant (less than 0.05). Statistics showed that all the questionnaire items were valid. They were  $< .4438$  (critical values for Pearson's correlation coefficient).

In contrast, Cronbach's alpha was utilized to ensure the research instrument's reliability. Results showed that the reliability coefficient of the research instrument was .983 (see table 3). This result indicates that the research instrument's reliability is excellent. Moreover, to ensure the reliability of the research instrument, the researcher makes sure that participants have only one opportunity to respond to the questionnaire and they know its purpose.

**Table 3**  
*Reliability Statistics*

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|------------------|----------------------------------------------|------------|
| .983             | .983                                         | 17         |

### **3.4. Data collection**

To gather data for the current research, the researcher has read the literature to understand the topic and find the available research instruments used to measure teachers' education for sustainable development competencies. After understanding the topic, the current research instrument was designed (for more information, see the research instrument section). After gaining the ethical approval to perform the research, a pilot study was done to ensure the current research instrument's validity, reliability and feasibility. After ensuring the research instrument's validity, reliability and feasibility, WhatsApp text invitation was used as the best way to ensure that the collected responses would be from the targeted population. The WhatsApp text invitation was written and sent by the researcher to GFP teachers at the University of Buraimi. The WhatsApp text included the research topic and objective to achieve the creditability of the research. It further included the study participation invitation and the study's ethical considerations. The study participants were notified that they have complete freedom to participate in the study, and the data that will be collected will be used only for research purposes. They were also notified of their responses' confidentiality and participation's anonymity. After receiving the current research participants' responses, they were saved in Excel format. A total of twenty-three teachers participated in the current study. Twenty questionnaires were taken for the research investigation. Three of them were discarded due to the sloppy completion.

## **4. Results**

The current research data were analyzed by Statistical Package for Social Science (SPSS) software (version 23). Descriptive statistics were utilized to find the mean (M), minimum (Min.), maximum (Max.) and Standard Deviation (SD). This step was done to answer the two current research questions: What education for sustainable development competencies do the GFP teachers at the University of Buraimi have? And what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess?

### **4.1. Descriptive statistics**

#### **4.1.1. Question one: what education for sustainable development competencies do the GFP teachers at the University of Buraimi have?**

##### **4.1.1.1. Descriptive statistics of the total ESD competencies, transversal competencies and science education competencies**

To answer question one, mean (M), minimum (Min.), maximum (Max.), and Standard Deviation (SD) were calculated. Table 4 shows the results.

**Table 4**

*Descriptive Statistics of the Total ESD Competencies, Transversal Competencies and Science Education Competencies*

|                                | N  | Minimum | Maximum | Mean    | Std. Deviation |
|--------------------------------|----|---------|---------|---------|----------------|
| ESD Competencies               | 20 | 7.00    | 35.00   | 29.5000 | 6.03062        |
| Transversal Competencies       | 20 | 6.00    | 30.00   | 25.0500 | 5.56753        |
| Science Education Competencies | 20 | 4.00    | 20.00   | 16.3500 | 3.71731        |
| Valid N (listwise)             | 20 |         |         |         |                |

Table 4 shows that GFP teachers' ESD competencies (M= 29.50) are higher than transversal competencies (M= 25.05) and science education competencies (M= 16.35), respectively. The table further shows that the result distribution of the ESD competencies (SD= 6.03) is higher than transversal competencies (SD= 5.56) and science education competencies (SD= 3.71), respectively.

#### **4.1.2. Question two: what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess?**

##### **4.1.2.1. Descriptive Statistics of the aspects of ESD competencies, transversal competencies and science education competencies**

##### **4.1.2.1.1. Descriptive statistics of ESD competencies' aspects**

To answer question two, mean (M), maximum (Max.), minimum (Min.), and Standard Deviation (SD) were calculated for ESD competencies' aspects. Results are presented in table 5.

**Table 5**

*Descriptive Statistics of ESD Competencies' Aspects*

|                                                                                                                                  | N  | Minimum | Maximum | Mean   | Std. Deviation |
|----------------------------------------------------------------------------------------------------------------------------------|----|---------|---------|--------|----------------|
| I can raise my students' environmental awareness.                                                                                | 20 | 1.00    | 5.00    | 4.3500 | .98809         |
| I can foster my students' sense of belonging to the environment.                                                                 | 20 | 1.00    | 5.00    | 4.2500 | 1.01955        |
| I can help my students to think about different scenarios or alternatives to a situation or problem on a local and global scale. | 20 | 1.00    | 5.00    | 4.2500 | .96655         |

|                                                                                                                                                                                            |    |      |      |        |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|------|--------|--------|
| I can promote my students' critical analysis of some phenomenon or subject where my students could position themselves to argue for and respect different points of view.                  | 20 | 1.00 | 5.00 | 4.2000 | .95145 |
| I can promote my students' ability to act and make decisions.                                                                                                                              | 20 | 1.00 | 5.00 | 4.1500 | .93330 |
| I can promote my students' skills to collaborate in socio-educational actions as part of a cooperative community, including the participation of different stakeholders in sustainability. | 20 | 1.00 | 5.00 | 4.0000 | .91766 |
| I can promote my students' educational values oriented towards responsible and active citizenship.                                                                                         | 20 | 1.00 | 5.00 | 4.3000 | .92338 |
| Valid N (listwise)                                                                                                                                                                         |    | 20   |      |        |        |

Table 5 shows that GFP teachers are more competent in raising students' environmental awareness ( $M= 4.3500$ ) and promoting students' educational values oriented towards responsible and active citizenship ( $M= 4.3000$ ), respectively, than the other ESD competencies' aspects. Furthermore, the table shows that the result distributions of the ESD competencies' aspects, fostering students' sense of belonging to the environment ( $SD= 1.01955$ ) and raising students' environmental awareness ( $SD= .98809$ ) are higher than the rest of the ESD competencies' aspects.

#### **4.1.2.1.2. Descriptive statistics of transversal competencies' aspects**

To answer question two, mean (M), maximum (Max.), minimum (Min.), and Standard Deviation (SD) were calculated for transversal competencies' aspects. Table 6 shows the results.

**Table 6**

*Descriptive Statistics of Transversal Competencies' Aspects*

|                                                                   | N  | Minimum | Maximum | Mean   | Std. Deviation |
|-------------------------------------------------------------------|----|---------|---------|--------|----------------|
| I can put an emphasis on intellectual development in my teaching. | 20 | 1.00    | 5.00    | 4.4000 | .94032         |

|                                                                                                                                     |    |      |      |        |         |
|-------------------------------------------------------------------------------------------------------------------------------------|----|------|------|--------|---------|
| I can develop habits and attitudes toward promoting of healthy lifestyles among my students at the personal and community level.    | 20 | 1.00 | 5.00 | 4.1000 | 1.07115 |
| I can promote reflection and individual and collective responsibility among my students.                                            | 20 | 1.00 | 5.00 | 4.1500 | .98809  |
| I can teach my students to work transversally from different perspectives and areas of a situation or problem and interrelate them. | 20 | 1.00 | 5.00 | 4.2000 | 1.00525 |
| I can help my students to take actions of respecting and valuing the diversity of biological social and cultural issues.            | 20 | 1.00 | 5.00 | 4.3000 | 1.03110 |
| I can control my students' projects to be sustainable.                                                                              | 20 | 1.00 | 5.00 | 3.9000 | 1.02084 |
| Valid N (listwise)                                                                                                                  | 20 |      |      |        |         |

Table 6 shows that GFP teachers are more competent in putting an emphasis on intellectual development in their teaching ( $M = 4.4000$ ) and helping students to take actions of respecting and valuing the diversity of biological, social and cultural issues ( $M = 4.3000$ ) respectively than the rest of transversal competencies' aspects. Furthermore, table 6 shows that the result distributions of the transversal competencies' aspects, developing habits and attitudes toward promoting healthy lifestyles among students at the personal and community level ( $SD = 1.07115$ ) and helping students to take actions of respecting and valuing the diversity of biological social and cultural issues ( $SD = .98809$ ) respectively are higher than the rest of the transversal competencies' aspects.

#### **4.1.2.1.3. Descriptive statistics of science education competencies' aspects**

To answer question two, the mean ( $M$ ), maximum ( $Max.$ ), minimum ( $Min.$ ) and Standard Deviation ( $SD$ ) of science education competencies' aspects. Results are presented in table 7.



**Table 7**

*Descriptive Statistics of Science Education Competencies' Aspects*

|                                                                                                                       | N  | Minimum | Maximum | Mean   | Std.<br>Deviation |
|-----------------------------------------------------------------------------------------------------------------------|----|---------|---------|--------|-------------------|
| I can explain and interpret a phenomenon scientifically and identify appropriate explanations and predictions for it. | 20 | 1.00    | 5.00    | 3.8000 | 1.05631           |
| I can observe facts and/or phenomena identifying evidence and contrasting data.                                       | 20 | 1.00    | 5.00    | 4.0500 | .99868            |
| I can analyze the impact of human activities on the environment and suggest improvement actions.                      | 20 | 1.00    | 5.00    | 4.2000 | 1.05631           |
| I can think about the effects of my behaviours on my country and the world.                                           | 20 | 1.00    | 5.00    | 4.3000 | .92338            |
| Valid N (listwise)                                                                                                    | 20 |         |         |        |                   |

Table 7 shows that GFP teachers are more competent in thinking about the effects of their behaviors on their countries and the world ( $M = 4.3000$ ) than analyzing the impact of human activities on the environment and suggesting improvement actions ( $M = 4.2000$ ), observing facts and/or phenomena identifying evidence and contrasting data ( $M = 4.0500$ ), and explaining and interpreting a phenomenon scientifically identifying appropriate explanations and predictions for it ( $M = 3.8000$ ).

## 5. Discussion

The current research results show that GFP teachers' ESD competencies are higher than their transversal and science education competencies. This result implies that GFP teachers could have knowledge of education for sustainable development, but they need to gain the skills to apply it in personal or educational domains. This result is in a similar vein to Ammoneit, Turek and Peter (2022), who found that teachers had high ESD-related professional competencies. However, they need to be more confident in pedagogical knowledge. This result is also in the same line with Nikolaou (2021), who found that there is a low level of pedagogical approaches to innovation in higher education in Oman.

Results further show that GFP teachers are more competent in raising students' environmental awareness and promoting students' educational values oriented towards responsible and active citizenship respectively than helping students to think about different scenarios or alternatives to a situation or problem on a local and global scale, fostering students sense of belonging to the environment, promoting students' critical analysis of some phenomenon or subject where students could position themselves to argue for and

respect different points of view, promoting students' ability to act and make decisions and promoting students' skills to collaborate in socio-educational actions as part of a cooperative community, including the participation of different stakeholders of sustainability. This result suggests that GFP teachers could provide learners with general knowledge of the importance of sustainability, but they could not scaffold their learning. They could provide general guidance on the importance of preserving the environment, but they could not help them to observe, reflect or act on environmental issues. This result could further suggest that GFP teachers could have the ESD content knowledge but not the pedagogical one. This result also suggests that GFP teachers could raise students' awareness of environmental issues in a specific context, but they could not expand that to the world. Therefore, they could develop country citizenship but not the global one. This result is in the same line with Ammoneit, Turek and Peter (2022), who have found that teachers were least confident in pedagogical knowledge. In addition, this result is in accordance with Al-Maamari (2021), who found that educators associated citizenship with patriotism in the teaching process. However, teachers had limited practices which were associated with citizenship education.

Results also show that GFP teachers are more competent in putting an emphasis on intellectual development in their teaching than helping students to reflect on a problem or situation and taking an action to solve the problem or situation respecting and valuing the diversity of biological, social and cultural issues. Results also show that GFP teachers are more competent in putting an emphasis on intellectual development than teaching students how to work transversally from different perspectives and areas of a situation or problem at the personal and community level and having the commitment to test the suggested solutions. The results also show that teachers are less competent in controlling students' projects to be sustainable. This result implies that GFP teachers could help learners theoretically but not practically. This result implies that teachers could have knowledge of environmental issues, and they could develop students' thinking skills. However, they need to gain the skills to connect the learning process with the community as a source of knowledge. Furthermore, this result suggests that GFP teachers could have the skills to develop the thinking skills of students but not in an authentic way. This result is in the same line as Nikolaou (2021), who found significant differences in the level of awareness among logistics faculty members in higher education of the application of education for sustainable development. He found that there is a low level of cooperation with the community in providing placements and internships in higher education. The study implications also showed a low level of awareness among faculty of pedagogical approaches to achieve innovation in higher education. Therefore, there were limited opportunities for putting theories into practice.

In addition, the current research results show that GFP teachers are more competent in thinking about the effects of their behaviours on their countries and the world than analyzing the impact of human activities on the environment and suggesting improvement actions, observing facts and/or phenomena identifying evidence and contrasting data, explaining and interpreting a phenomenon scientifically and identifying appropriate

explanations and predictions for it. This result implies that GFP teachers do not have reflective practice skills. They could interact with the environment and its issues. They could contextualize the issues and find the interrelations. However, they need to gain the skills and commitment to analyze the problems, suggest theories, and test these theories in the field. This result is against Maidou, Plakitsi and M. Polatoglou (2019), who found that teachers had knowledge of the environmental aspects of ESD. However, they did not have knowledge of societal and financial matters.

## **6. Conclusion**

The current quantitative research aims to investigate Omani higher education General Foundation Program (GFP) teachers' competencies for education for sustainable development. It aims to answer two questions: What education for sustainable development competencies do the GFP teachers at the University of Buraimi have? And what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess? Results showed that GFP teachers' ESD competencies are higher than their transversal and science education competencies, respectively. As for ESD competencies' aspects, results showed that GFP teachers are more competent in raising students' environmental awareness and promoting their educational values oriented towards responsible and active citizenship respectively than the other aspects of ESD competencies. Results showed that helping students to think about different scenarios or alternatives to a situation or problem on a local and global scale, fostering students' sense of belonging to the environment, promoting students' critical analysis of some phenomenon or subject where students could position themselves to argue for and respect different points of view, promoting students' ability to act and make decisions and promoting their skills to collaborate in socio-educational actions as part of a cooperative community, including the participation of different stakeholders of sustainability are some ESD aspects which were less competent by GFP teachers. Regarding transversal competencies' aspects, results showed that GFP teachers are more competent in putting an emphasis on intellectual development in their teaching than helping students to reflect and take actions respecting and valuing the diversity of biological, social and cultural issues. Results showed that GFP teachers are less competent in teaching students to work transversally from different perspectives and areas of a situation or problem and interrelating them, promoting reflection individual and collective responsibility among students, developing habits and attitudes to the promotion of healthy lifestyles among them at the personal and community level and controlling students' projects to be sustainable respectively. As for science education competencies' aspects, results showed that GFP teachers are more competent in thinking about the effects of their behaviors on their countries and the world. Results showed that analyzing the impact of human activities on the environment and suggesting improvement actions, observing facts and/or phenomena identifying evidence and contrasting data, explaining and interpreting a phenomenon scientifically and identifying appropriate explanations and predictions for it were the aspects which were less competent by GFP teachers. Notwithstanding this research discussed Omani higher education General Foundation Program (GFP) teachers' competencies for education for sustainable

development, results cannot be generalized. Results were done on a small number of participants. Being not doing the research using a mixed method research design, the current research has a limitation. Conducting observations or interviews could expand the understanding of the results. Future research studies could duplicate the current research in other contexts. Future studies could investigate teachers' competencies of education for sustainable development in the ministry of education. Future studies could also investigate the self-efficacy of teachers and students in applying education for sustainable development. They could investigate the teachers' competencies in assessing education for sustainable development. They could investigate the interface between teachers' competencies, reflective practice and self-efficacy. The current research recommends all the stakeholders of the educational field to develop the knowledge, skills and values of education for sustainable development. All teachers must have them to facilitate students' learning and have a profound transformation of education. The current research further recommends all professional programs' directors, locally or globally, to activate the practices of reflective practice. It is a tool for producing authentic teaching and learning. Therefore, education could enhance the sustainable practices of sustainable societies.

#### **List of abbreviations**

| <b>N</b> | <b>Abbreviation</b> | <b>Meaning</b>                                                   |
|----------|---------------------|------------------------------------------------------------------|
| 1.       | CELTA               | Cambridge Certificate in English Language Teaching to Adults     |
| 2.       | ESD                 | Education for Sustainable Development                            |
| 3.       | ESP                 | English                                                          |
| 4.       | GFP                 | General Foundation Program                                       |
| 5.       | IT                  | Information Technology                                           |
| 6.       | M                   | Mean                                                             |
| 7.       | Max.                | Maximum                                                          |
| 8.       | Min.                | Minimum                                                          |
| 9.       | N                   | Number                                                           |
| 10.      | SD                  | Standard Deviation                                               |
| 11.      | SD.                 | Sustainable Development                                          |
| 12.      | SPSS                | Statistical Package for Social Science                           |
| 13.      | TESOL               | Teaching English to Speakers of Other Languages                  |
| 14.      | UNESCO              | United Nations Educational, Scientific and Cultural Organization |
| 15.      | WCED                | World Commission on Environment and Development                  |

## References

- Abasaid, M., & Ferreira, M. P. (2022). Perception and knowledge of critical thinking: A qualitative research study with professors of higher education in Oman. *Journal of Educational Studies and Multidisciplinary Approaches*, 2(2), 2-18.
- Agbedahin, A. V. (2019). Sustainable development, education for sustainable development, and the 2030 agenda for sustainable development: Emergence, efficacy, eminence, and future. *Sustainable Development*, 27(4), 669-680.
- Ali, H. I. H., Al-Saadi, Z., & Scatolini, S. S. (2022). Conceptualizing graduates attributes (GAs) in English language teacher education programs in Oman during the COVID-19 pandemic. *SAGE Open*, 12(3), 21582440221113831.
- Al-Maamari, S. (2021). Caring, sharing and giving without any hesitation: Teacher educators' perceptions and practices of citizenship education at Sultan Qaboos University in Oman. *European Journal of Educational Research*, 10(3), 1437-1447.
- Ammonet, R., Turek, A., & Peter, C. (2022). Pre-Service geography teachers' professional competencies in education for sustainable development. *Education Sciences*, 12(1), 42.
- Butova, Y. (2015). The history of development of competency-based education. *European Scientific Journal*. (1), 250-255.
- Cebrián, G., & Junyent, M. (2015). Competencies in education for sustainable development: Exploring the student teachers' views. *Sustainability*, 7(3), 2768-2786.
- Cebrián, G., Junyent, M., & Mulà, I. (2020). Competencies in education for sustainable development: Emerging teaching and research developments. *Sustainability*, 12(2), 579.
- Chuliá-Jordán, R., Vilches Peña, A., & Calero Llinares, M. (2022). The press as a resource for promoting sustainability competencies in teacher training: The case of SDG 7. *Sustainability*, 14(2), 857.
- Cifuentes-Faura, J., Faura-Martínez, U., & Lafuente-Lechuga, M. (2020). Assessment of sustainable development in secondary school economics students according to gender. *Sustainability*, 12(13), 5353.
- Daniali, S. M., Barykin, S. E., Khortabi, F. M., Kalinina, O. V., Tcukanova, O. A., Torosyan, E. K., ... & Senjyu, T. (2022). An employee competency framework in a welfare organization. *Sustainability*, 14(4), 2397.
- Gervais, J. (2016). The operational definition of competency-based education. *The Journal of Competency-Based Education*, 1(2), 98-106.
- Haddouchane, Z. A., Bakkali, S., Ajana, S., & Gassemi, K. (2017). The application of the competency-based approach to assess the training and employment adequacy problem. *International Journal of Education (IJE)*, 5(1), 1-18.
- Henderson, T. S., Michel, J. O., Bryan, A., Canosa, E., Gamalski, C., Jones, K., & Moghtader, J. (2022). An exploration of the relationship between sustainability-related involvement and learning in higher education. *Sustainability*, 14(9), 5506.
- Henri, M., Johnson, M. D., & Nepal, B. (2017). A review of competency-based learning: Tools, assessments, and recommendations. *Journal of engineering education*, 106(4), 607-638.

- Imara, K., & Altinay, F. (2021). Integrating education for sustainable development competencies in teacher education. *Sustainability*, 13(22), 12555.
- Leal Filho, W. (2015). Education for sustainable development in higher education: reviewing needs. In W.L. Filho (Eds.), *Transformative approaches to sustainable development at universities* (pp. 3-12). Springer.
- Maidou, A., Plakitsi, K., & Polatoglou, H. M. (2019). Socrates' house: A suitable paradigm to introduce pre-service teachers to education for sustainable development. *Re-introducing science Sculpting the image of science*, 348.
- Makulova, A. T., Alimzhanova, G. M., Bekturganova, Z. M., Umirzakova, Z. A., Makulova, L. T., & Karymbayeva, K. M. (2015). Theory and practice of competency-based approach in education. *International Education Studies*, 8(8), 183-192.
- Moganadas, S. R., Subramaniam, S., Huey, N. S., & Bahaman, A. S. (2020). Campus sustainability: Measuring awareness of sustainable development dimensions among educators in Malaysian university. *International Journal of Education, Psychology and Counselling*, 5(37), 10-26.
- Nikolaou, P. (2021). Sustainable development: a developmental evaluation of logistics higher education in the Sultanate of Oman based on two innovation approaches (the triple helix of innovation and innovation competencies). *Higher Education Evaluation and Development*, 16 (1), 1-19.
- Rafika, K., Rym, K., Souad, S. B., & Youcef, L. (2016). A public actor awareness for sustainable development. *Procedia-Social and Behavioral Sciences*, 216, 151-162.
- Rieckmann, M., & Barth, M. (2022). Educators' competence frameworks in education for sustainable development. In p. Vare., N. Lausset. & M. Rieckmann (Eds.), *Competences in Education for Sustainable Development* (pp. 19-26). Springer.
- Scharenberg, K., Waltner, E. M., Mischo, C., & Rieß, W. (2021). Development of Students' Sustainability Competencies: Do Teachers Make a Difference? *Sustainability*, 13(22), 12594.
- Takkaç Tulgar, A. (2020). The effects of native versus multicultural classes on teacher self-efficacy: A case study of Turkish instructors. *Globalization, Societies and Education*, 18(5), 603-618.